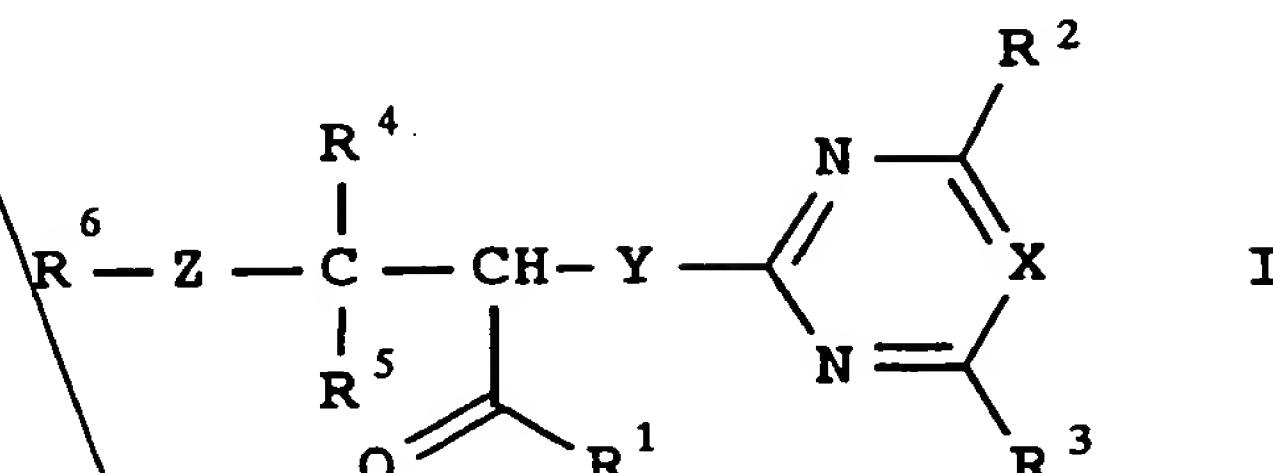


We claim:-

1. A 3-(het)arylcetoxylic acid derivative of the formula I

5

10



where R is formyl, CO_2H or a radical hydrolyzable to COOH and

15

R^2 is halogen, $\text{C}_1\text{-C}_4$ -alkyl, $\text{C}_1\text{-C}_4$ -haloalkyl, $\text{C}_1\text{-C}_4$ -alkoxy, $\text{C}_1\text{-C}_4$ -haloalkoxy or $\text{C}_1\text{-C}_4$ -alkylthio;

20

X is nitrogen or CR^{14} , where R^{14} is hydrogen or, together with R^3 , forms a 3-membered or 4-membered alkylene or alkenylene chain, in each of which a methylene group is replaced by oxygen;

25

R^3 is halogen, $\text{C}_1\text{-C}_4$ -alkyl, $\text{C}_1\text{-C}_4$ -haloalkyl, $\text{C}_1\text{-C}_4$ -alkoxy, $\text{C}_1\text{-C}_4$ -haloalkoxy or $\text{C}_1\text{-C}_4$ -alkylthio or R^3 is linked to R^{14} as stated above to form a 5-membered or 6-membered ring;

30

R^4 is phenyl or naphthyl which may be substituted by one or more, in particular one to three, of the following radicals: halogen, nitro, cyano, hydroxyl, mercapto, amino, $\text{C}_1\text{-C}_4$ -alkyl, $\text{C}_1\text{-C}_4$ -haloalkyl, $\text{C}_1\text{-C}_4$ -alkoxy, $\text{C}_1\text{-C}_4$ -haloalkoxy, $\text{C}_1\text{-C}_4$ -alkylthio, $\text{C}_1\text{-C}_4$ -alkylamino, di- $\text{C}_1\text{-C}_4$ -alkylamino, $\text{C}_1\text{-C}_4$ -alkylcarbonyl or $\text{C}_1\text{-C}_4$ -alkoxy-carbonyl;

35

a five-membered or six-membered heteroaromatic structure which contains one to three nitrogen atoms and/or one sulfur or oxygen atom and may carry one or more of the following radicals: halogen, nitro, cyano, hydroxyl, mercapto, amino, $\text{C}_1\text{-C}_4$ -alkyl, $\text{C}_1\text{-C}_4$ -haloalkyl, $\text{C}_1\text{-C}_4$ -alkoxy, $\text{C}_1\text{-C}_4$ -haloalkoxy, $\text{C}_1\text{-C}_4$ -alkylthio, $\text{C}_1\text{-C}_4$ -alkylamino, $\text{C}_1\text{-C}_4$ -dialkylamino, $\text{C}_1\text{-C}_4$ -alkylcarbonyl, $\text{C}_1\text{-C}_4$ -alkoxycarbonyl or phenyl;

45

R^5 is hydrogen, C_1-C_4 -alkyl, C_3-C_6 -alkenyl, C_3-C_6 -alkynyl, C_3-C_8 -cycloalkyl, C_1-C_4 -haloalkyl, C_1-C_4 -alkoxyalkyl, C_1-C_4 -alkylthioalkyl or phenyl;

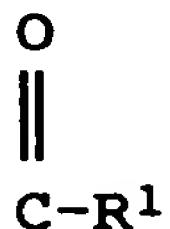
5 R^6 is C_1-C_8 -alkyl, C_3-C_6 -alkenyl, C_3-C_6 -alkynyl or C_3-C_8 -cycloalkyl, it being possible for these radicals to be mono- or polysubstituted in each case by: halogen, nitro, cyano, C_1-C_4 -alkoxy, C_3-C_6 -alkenyloxy, C_3-C_6 -alkynyloxy, C_1-C_4 -alkylthio, C_1-C_4 -haloalkoxy, C_1-C_4 -alkylcarbonyl, C_1-C_4 -alkoxycarbonyl, C_1-C_4 -alkylamino, di- C_1-C_4 -alkylamino, phenyl or phenyl or phenoxy which is mono- or polysubstituted, for example mono- to trisubstituted, by halogen, nitro, cyano, C_1-C_4 -alkyl, C_1-C_4 -haloalkyl, C_1-C_4 -alkoxy, C_1-C_4 -haloalkoxy or C_1-C_4 -alkylthio;

10 Y is sulfur or oxygen or a single bond; and

15 Z is sulfur or oxygen;

20 with the proviso that R^6 is not unsubstituted C_1-C_4 -alkyl when R^4 is unsubstituted phenyl, Z is oxygen and simultaneously R^5 is methyl or hydrogen.

25 2. A 3-(het)arylcarboxylic acid derivative of the general formula I as claimed in claim 1, where R is



where R^1 has the following meanings:

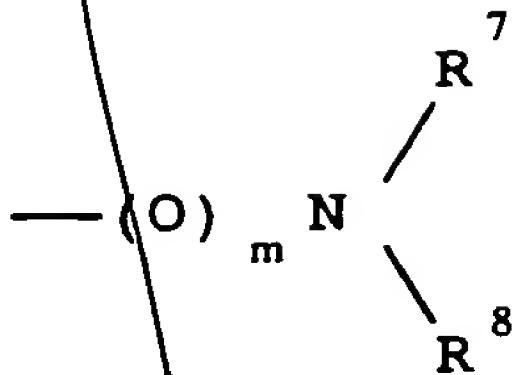
35 a) hydrogen;

b) a succinylimidoxy group;

40 c) a 5-membered heteroaromatic structure which is bonded via a nitrogen atom, contains two or three nitrogen atoms and may carry one or two halogen atoms or one or two of the following radicals:

45 C_1-C_4 -alkyl, C_1-C_4 -haloalkyl, C_1-C_4 -alkoxy, C_1-C_4 -haloalkoxy or C_1-C_4 -alkylthio;

d) a radical



10 where m is 0 or 1 and R^7 and R^8 , which may be identical or different, have the following meanings:

hydrogen;

15 C₁-C₈-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl or C₃-C₈-cyclo-alkyl, where each of these radicals may carry one to five halogen atoms or one or two of the following groups:

C_1-C_4 -alkoxy, C_3-C_6 -alkenyloxy, C_3-C_6 -alkynyloxy,

C₁-C₄-alkylthio, C₃-C₆-alkenylthio, C₃-C₆-alkynylthio

C_1-C_4 -haloalkoxy, C_1-C_4 -alkylcarbonyl, C_3-C_6 -alkenyl-

20 carbonyl, C₃-C₆-alkynylcarbonyl, C₁-C₄-alkoxycarbonyl,

C_3-C_6 -alkenylloxycarbonyl, C_3-C_6 -alkynylloxycarbonyl,

di- C_1 - C_4 -alkylamino, C_3 - C_8 -cycloalkyl, phenyl or phenyl-

which is monosubstituted or polysubstituted by halogen.

nitro, cyano, $C_1=C_2$ -alkyl, $C_1=C_2$ -haloalkyl, $C_1=C_2$ -alko

25 ~~$\text{C}_1=\text{C}_2=\text{haloalkoxy}$ or $\text{C}_1=\text{C}_2=\text{alkylthio}$~~

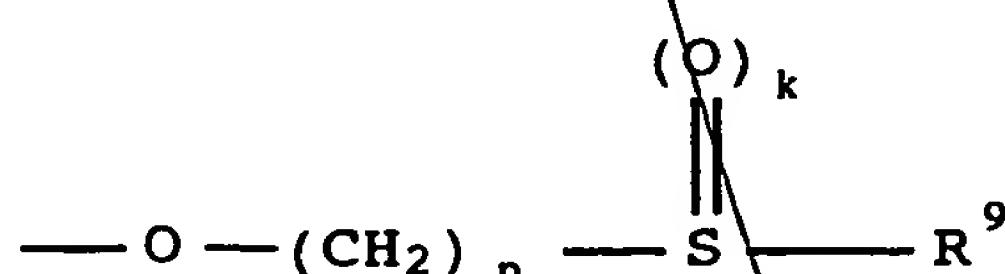
phenyl which may be substituted by one or more of the following radicals: halogen, nitro, cyano, C_1-C_4 -alkyl,

$C_1=C_4$ =haloalkyl, $C_1=C_4$ =alkoxy, $C_1=C_4$ =haloalkoxy or

30 C₁-C₄-alkylthio-

35 R⁷ and R⁸ together form a cyclic, optionally substituted C₄-C₇-alkylene chain or together form a cyclic, optionally substituted C₃-C₆-alkylene chain containing a heteroatom selected from the group consisting of oxygen, sulfur and nitrogen;

e) \mathbb{R}^1 is furthermore a group



45 where R⁹ is C₁-C₄-alkyl, phenyl or phenyl which is mono-
substituted or polysubstituted by halogen, nitro, cyano,
C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-halo-

alkoxy or C_1 - C_4 -alkylthio, or C_1 - C_4 -haloalkyl, C_3 - C_6 -alkenyl or C_3 - C_6 -alkynyl, p may be 1, 2, 3 or 4 and k may be 0, 1 or 2.

5 f) a radical OR^{10} , where R^{10} is:

i) hydrogen, an alkali metal cation, one equivalent of an alkaline earth metal cation, the ammonium cation or an organic ammonium ion;

10 ii) C_3 - C_8 -cycloalkyl which may carry one to three C_1 - C_4 -alkyl radicals;

15 iii) C_1 - C_8 -alkyl which may carry one to five halogen atoms or one of the following radicals:

C_1 - C_4 -alkoxy, C_1 - C_4 -alkylthio, cyano, C_1 - C_4 -alkyl-carbonyl, C_3 - C_8 -cycloalkyl, C_1 - C_4 -alkoxycarbonyl, phenyl, phenoxy or phenylcarbonyl, where the aromatic radicals in turn may each carry one to five halogen atoms or one to three of the following radicals: nitro, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -alkoxy, C_1 - C_4 -haloalkoxy [sic] or C_1 - C_4 -alkylthio;

25 iv) C_1 - C_8 -alkyl which may carry one to five halogen atoms and carries one of the following radicals: a 5-membered heteroaromatic structure containing one to three nitrogen atoms or a 5-membered heteroaromatic structure containing one nitrogen atom and one oxygen or sulfur atom, which may carry one to four halogen atoms or one or two of the following radicals: nitro, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -alkoxy, C_1 - C_4 -haloalkoxy or C_1 - C_4 -alkylthio;

30 v) C_2 - C_6 -alkyl which carries one of the following radicals in the 2 position: C_1 - C_4 -alkoxyimino, C_3 - C_6 -alkenyloxyimino, C_3 - C_6 -haloalkenyloxyimino or benzyloxyimino;

40 vi) C_3 - C_6 -alkenyl or C_3 - C_6 -alkynyl, where these groups in turn may carry one to five halogen atoms;

45

vii) phenyl which may carry one to five halogen atoms or one to three of the following radicals: nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio;

5

viii) a 5-membered heteroaromatic structure which has bonded via a nitrogen atom, contains one to three nitrogen atoms and may carry one or two halogen atoms or one or two of the following radicals: nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio;

10

15

ix) R¹⁰ is furthermore a group $\text{---N}=\text{C}(\text{---R}^{11})(\text{---R}^{12})$ where

R¹¹ and R¹², may be identical or different and are each:

20

C₁-C₈-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl or C₃-C₈-cycloalkyl, where these radicals may carry one C₁-C₄-alkoxy or C₁-C₄-alkylthio or one phenyl radical;

25

phenyl which may be substituted by one or more of the following radicals:

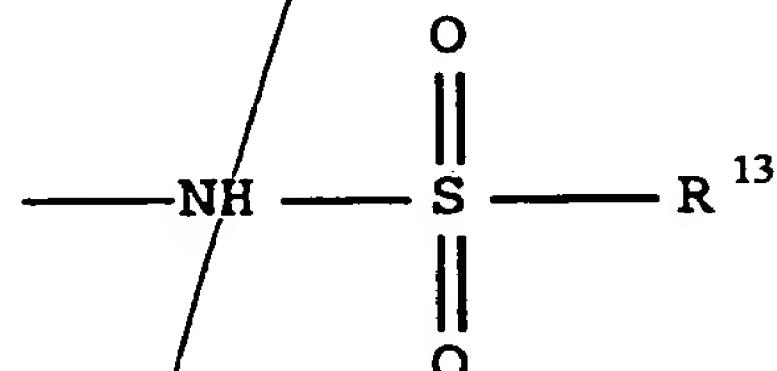
halogen, nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio;

30

or R¹¹ and R¹² together form a C₃-C₁₂-alkylene chain which may carry one to three C₁-C₄-alkyl groups;

g) or R¹ forms a radical

35



40

where R¹³ is:

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C₁-C₄-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl or C₃-C₈-cycloalkyl, where these radicals may carry one C₁-C₄-alkoxy or C₁-C₄-alkylthio or one phenyl radical;

phenyl which may be substituted by one to five halogen atoms or one to three of the following radicals: nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio.

5 3. A 3-arylcarboxylic acid derivative of the formula I as claimed in claim 1, in which R⁴ is phenyl which may be substituted as stated in claim 1 and the remaining substituents have the meanings stated in claim 1.

10 4. A 3-arylcarboxylic acid derivative of the formula I as claimed in claim 1, in which Z is oxygen, R⁴ is phenyl which may be substituted as stated in claim 1, R⁵ is methyl, X is CH, R² and R³ are each methoxy and Y, R¹ and R⁶ have the meanings stated in claim 1.

15 5. A 3-hetarylcarboxylic acid derivative of the formula I as claimed in claim 1, in which R⁴ is a five- or six-membered heteroaromatic structure as claimed in claim 1 and the remaining substituents have the meanings stated in claim 1.

20 6. A 3-hetarylcarboxylic acid derivative of the formula I as claimed in claim 1, in which Z is oxygen, R⁴ is a five- or six-membered heteroaromatic structure as claimed in claim 1, R⁵ is methyl, X is CH, R² and R³ are methoxy and Y, R¹ and R⁶ have the meanings stated in claim 1.

25 7. A herbicide containing a compound of the formula I as claimed in claim 1 and conventional inert additives.

30 8. A method for controlling undesirable plant growth, wherein a herbicidal amount of a compound of the formula I as claimed in claim 1 is allowed to act on the plants or on their habitat.

35 9. An agent for influencing plant growth, containing a compound of the formula I as claimed in claim 1 and conventional inert additives.

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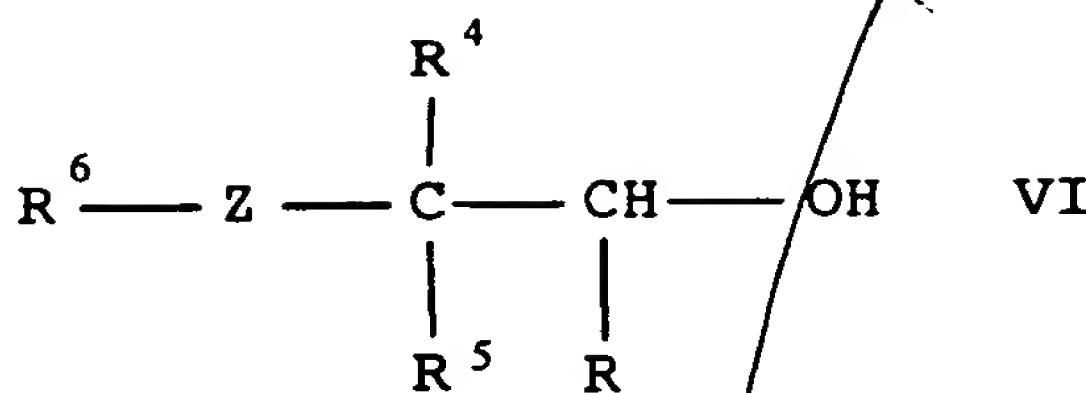
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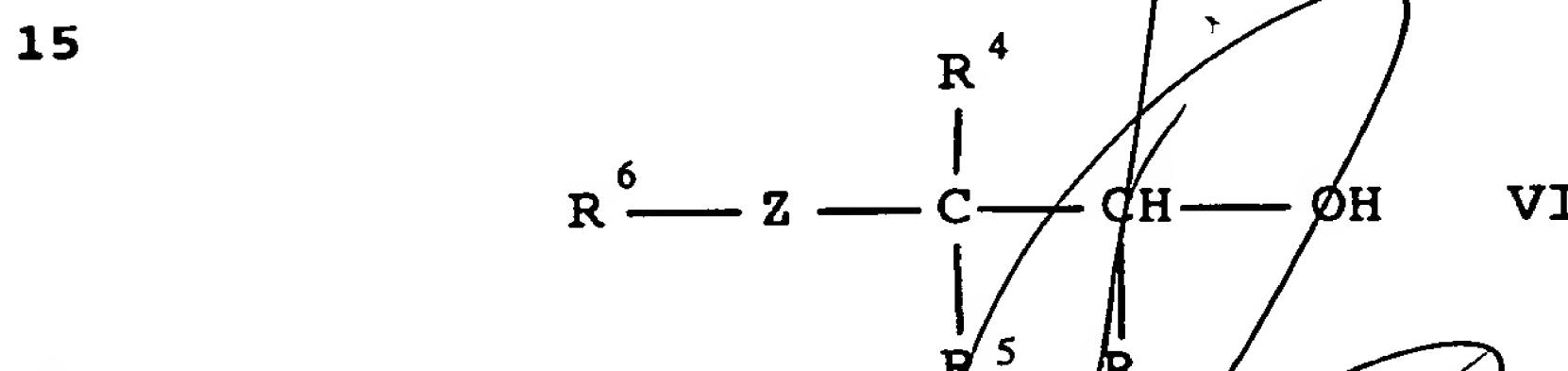
40 10. A method for regulating plant growth, wherein a bioregulatory amount of a compound of the formula I as claimed in claim 1 is allowed to act on the plants or on their habitat.

11. A 3-(het)arylcarboxylic acid derivative of the formula VI
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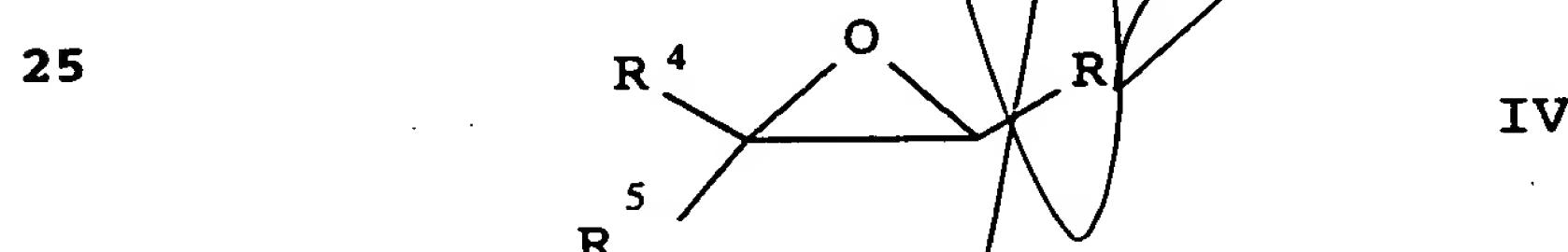
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where R , R^4 , R^5 , R^6 and Z have the meanings stated in claim 1, with the proviso that R^6 is not unsubstituted alkyl when R^4 is unsubstituted phenyl or 4-isobutylphenyl, Z is oxygen and R^5 is simultaneously methyl or hydrogen.

12. A process for the preparation of a 3-(het)arylcarboxylic acid derivative of the formula VI



20 wherein an epoxide of the formula IV



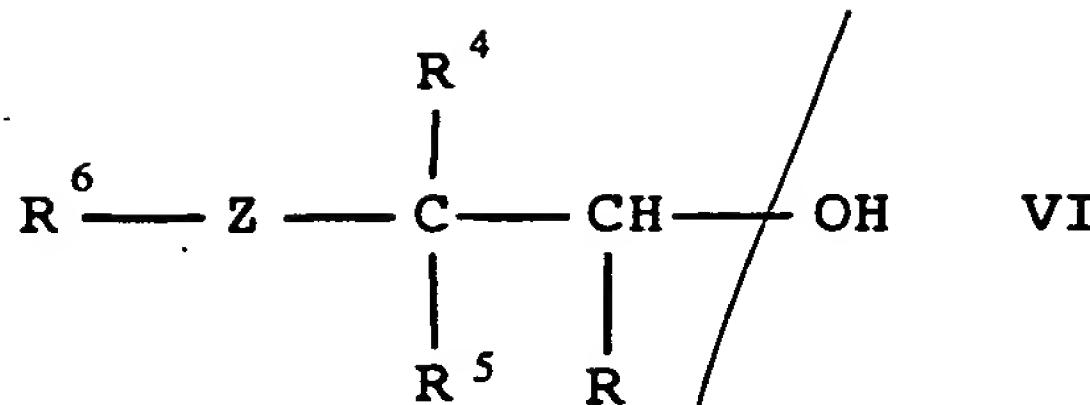
30 where R , R^4 and R^5 have the meanings stated in claim 1, is reacted with a compound of the formula V



35 where R^6 and Z have the meanings stated in claim 1, with the proviso that R^6 is not unsubstituted alkyl when R^4 is unsubstituted phenyl or 4-isobutylphenyl, Z is oxygen and R^5 is simultaneously methyl or hydrogen, if required in an inert 40 solvent or with the addition of a suitable catalyst.

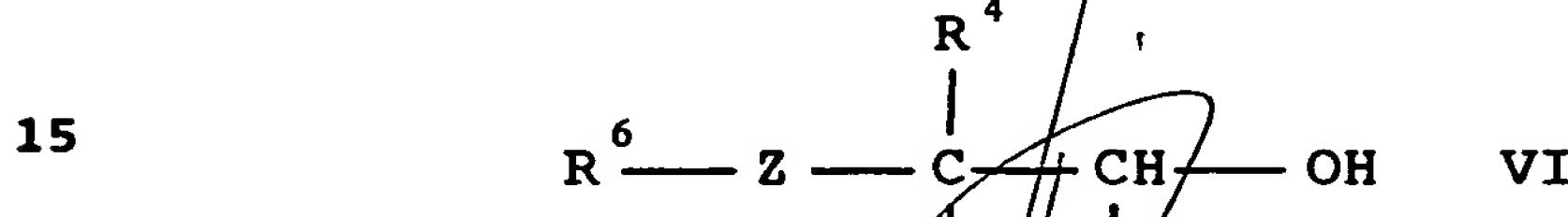
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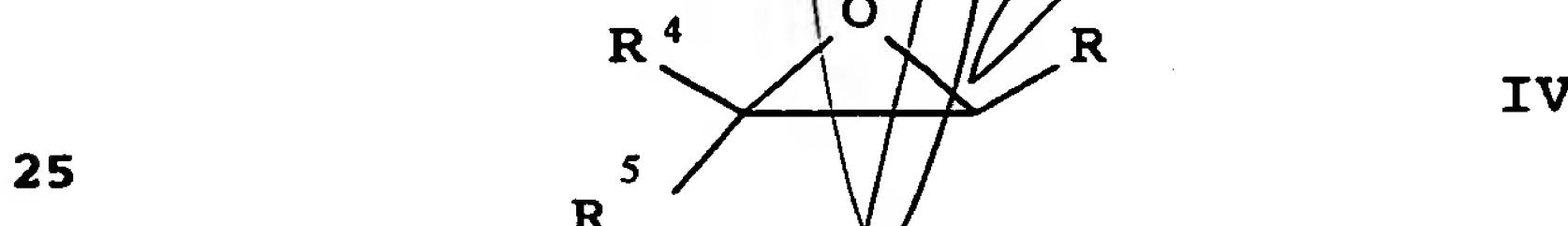


where R , R^4 , R^5 , R^6 and Z have the meanings stated in claim 1.

10 12. A process for the preparation of a 3-(het)arylcarboxylic acid derivative of the formula VI



20 wherein an epoxide of the formula IV



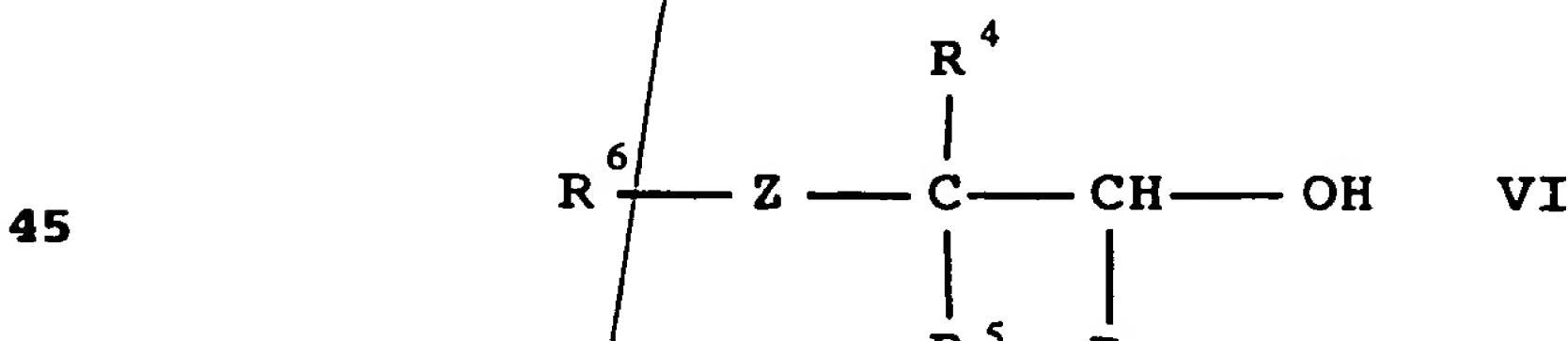
where R , R^4 and R^5 have the meanings stated in claim 1, is reacted with a compound of the formula V

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35 where R^6 and Z have the meanings stated in claim 1, if required in an inert solvent or with the addition of a suitable catalyst.

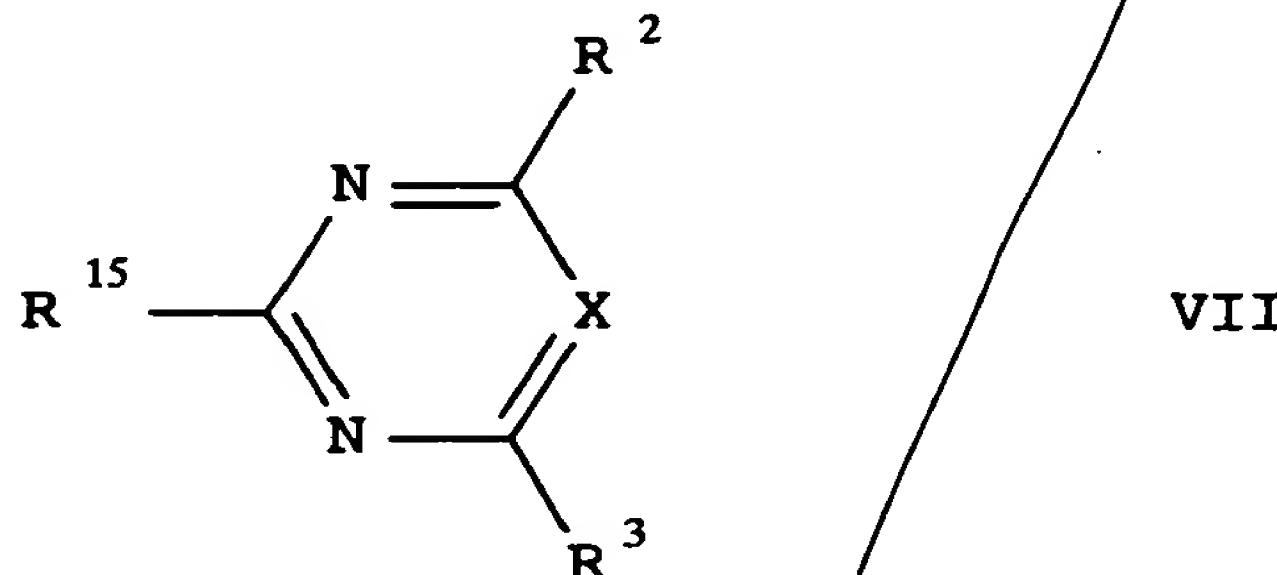
40 13. A process for the preparation of 3-(het)arylcarboxylic acid derivatives of the formula I as claimed in claim 1, where Y is oxygen wherein the 3-het(aryl)carboxylic acid derivative of the formula VI



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where the substituents have the meanings stated in claim 1,
is reacted with a pyrimidyl or triazinyl derivative of the
formula VII

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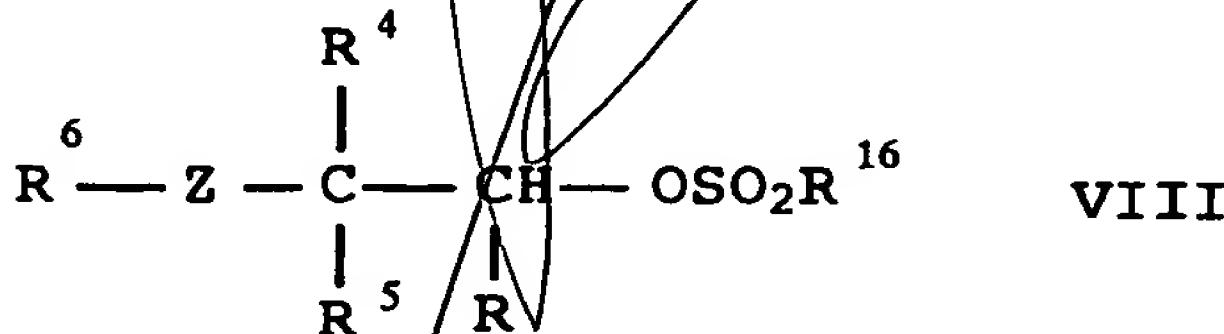


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15 where R^{15} is halogen or $R^{16}SO_2^-$ and R^{16} is C_1-C_4 -alkyl,
 C_1-C_4 -haloalkyl or phenyl, in an inert solvent in the presence
of a base.

20 14. A process for the preparation of a 3-het(aryl)carboxylic acid
derivative of the formula I as claimed in claim 1, where Y is
sulfur, wherein a 3-het(aryl)carboxylic acid derivative of
the formula VIII

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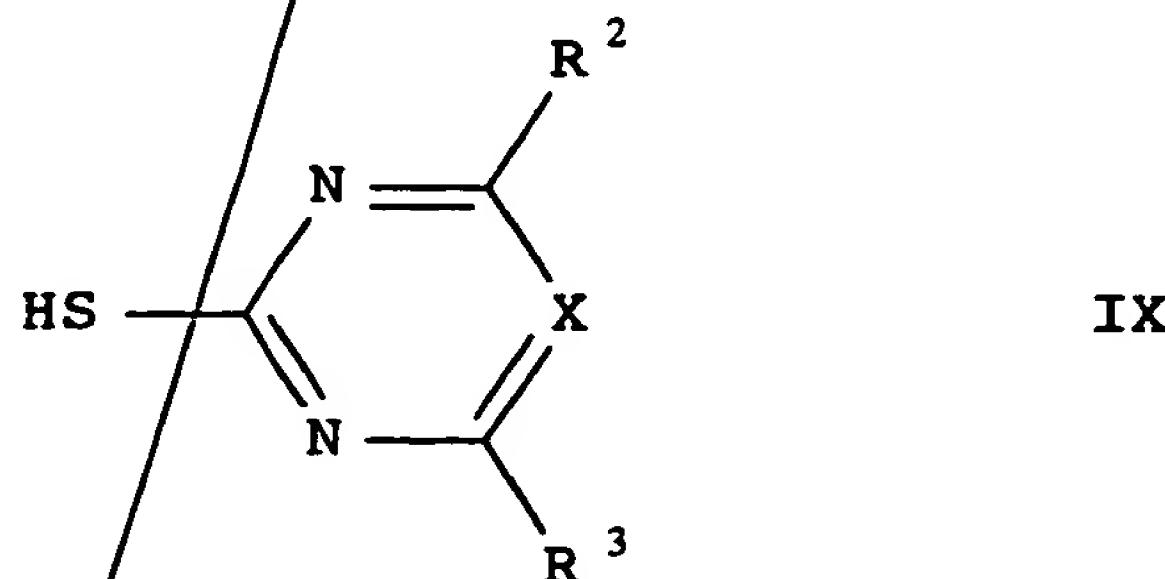


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R, R4, R5, R6 and Z
where the substituents have the meanings stated in claim 1,
is reacted with a pyrimidyl- or triazinylthiol of the formula
IX

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where R^2 , R^3 and X have the meanings stated in claim 1.

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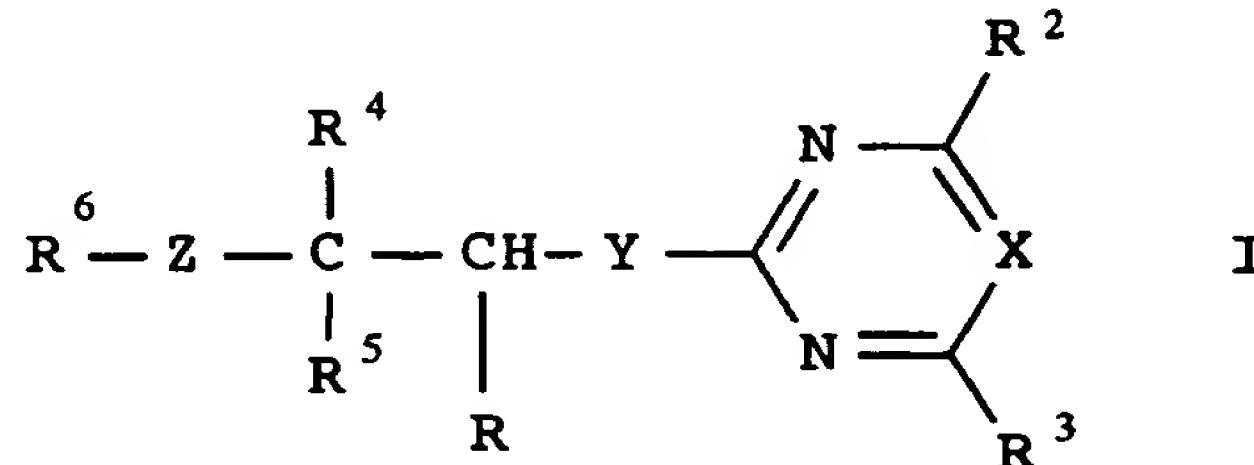
3-(Het)arylcarboxylic acid derivatives, their preparation and intermediates for their preparation

5 Abstract

3-(Het)arylcarboxylic acid derivatives of the formula I

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where R is formyl, CO_2H or a radical hydrolyzable to COOH and the other substituents have the following meanings:

20 R^2 and R^3 are each halogen, alkyl, haloalkyl, alkoxy, haloalkoxy or alkylthio;

25 X is nitrogen or CR^{14} , where R^{14} is hydrogen or, together with R^3 , forms an alkylene or alkenylene chain, in each of which a methylene group is replaced by oxygen;

30 R^4 is phenyl or naphthyl, each of which is unsubstituted or substituted or an unsubstituted or substituted five-membered or six-membered heteroaromatic structure containing one to three nitrogen atoms or one sulfur or oxygen atom;

R^5 is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, haloalkyl, alkoxyalkyl, alkylthioalkyl or phenyl;

35 R^6 is $\text{C}_1\text{-C}_8$ -alkyl, $\text{C}_3\text{-C}_6$ -alkenyl, $\text{C}_3\text{-C}_6$ -alkynyl or $\text{C}_3\text{-C}_8$ -cyclo-alkyl, each of which may be mono- or polysubstituted;

Y is sulfur, oxygen or a single bond; and

40 Z is sulfur or oxygen;

with the proviso that R^6 is not unsubstituted $\text{C}_1\text{-C}_4$ -alkyl when R^4 is unsubstituted phenyl, Z is oxygen and simultaneously R^5 is methyl or hydrogen.